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PATENT APPLICATION
Docket No. 2705-070

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Randall Baird, et al.		
Serial No.	09/409,922	Examiner:	Toan D. Nguyen
Confirmation No.	6051		
Filed:	September 30, 1999	Group Art Unit:	2665
For:	SCALABLE PACKET-SWITCHED CALL CONTROL SIGNALING		

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION TO OVERCOME A CITED PUBLICATION UNDER 37 C.F.R. § 1.131

1. The person making this declaration is Randall BAIRD, representative inventor of U.S. Patent Application Ser. No. 09/409,922 ('922 application) we reference in more detail above.

2. The examiner rejects certain claims of the '922 patent application under 35 U.S.C. § 103(a) as being unpatentable in view U.S. Patent No. 6,650,619 to Schuster et al.

3. Schuster was filed and has an effective date of March 17, 1999.

4. We conceived of the invention that is the subject of the claims in the '922 application prior to Schuster's effective date as we evidence by the attached portions of the invention disclosure (Exhibit A) we submitted internally to Cisco prior to the effective date (dates are blacked out as allowed by the rules).

5. We continuously conducted work on the invention from a date prior to the effective date until the date of filing of the present application and thereafter.

I declare that all statements made here of my own knowledge are true and that all statements made on information and belief are believed to be true. I understand that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Randall BAIRD

Dated 3/13/06

Patent Idea Details for Idea #41827

General Information

Title: Method for Achieving Scalable Control H.323 Signaling
ID: 41827
Patent No.: —, —
URL: [Application No. —]
Inventors: Leo Nieuwesteeg (leo) and Randall Baird (rbaird)
More details on these inventors listed below.
Date Entered: [redacted]
Date Modified: [redacted]
Date Filed: —
Date Issued: —

Background: The ITU's H.323 standard provides a mechanism for establishing voice, video, and other multimedia calls over an IP internet or other packet medium. The H.323 signaling (that is, the information which controls the call throughout its life) is handled by two different exchanges of PDUs, both mounted on top of TCP. In H.225.0, a set of PDUs modeled after Q.931 is exchanged to provide basic call control. In H.245, PDUs are exchanged to control media, codec, and conference selection, and to make modifications to these selections while a call or conference is ongoing.

In H.323 v1, both the Q.931 and H.245 connections require two separate TCP connections, which must persist during the life of the call. In H.323 v2, Q.931 and H.245 can in some cases be multiplexed onto a single TCP connection.

A common mechanism for allowing third-party call control in H.323 is to route the Q.931/H.245 connections through an intermediate call agent, using either gatekeeper-routed call signaling or an H.323 proxy. In the GK-routed call signaling mechanism, an endpoint requests to be connected to an address via a directory and admission module called a gatekeeper (GK). The GK, rather than instructing the endpoint to connect directly to the terminating endpoint, instructs that the connection be made through the GK itself. The GK is then capable of controling and modifying the signaling without affecting the the underlying media streams, which can flow directly between the endpoints. If a proxy is used, the GK can instruct the originator to connect the Q.931 and H.245 to the proxy, along with the underlying media stream. Proxies are typically used when the media must be converted for firewall or NAT traversal, or when the QoS of the media must be modified.

Note that H.323 explicitly allows for differing paths for the signaling and the media streams (which are transported using RTP). This allows signaling control elements to be inserted into the path without adversely impacting media performance. Call agents must obviously have a mechaism through which endpoints like gateways can be instructed to emit appropriate RTP streams to other endpoints. This can be accomplished using a protocol which is much simpler and more efficient than H.323, like SGCP or MGCP.

The problem arises when it is necessary to have massive numbers of H.323 calls flowing through a single call agent. Since each call can consume up to 2 TCP connections and most platforms have limits on TCP connections that are well below 10,000, only a maximum of less the 5000 H.323 calls can be controlled by a single call agent box. In a carrier-class implementation based on H.323, hundreds of thousands or even millions of calls must be controllable at any given time.

Summary: Scalability can be achieved by overcoming the TCP limitations. To do this,

[redacted] interim [redacted] H.323 call signaling duty [redacted] than actually performing their own control functions, they backhaul the signaling to a centralized call agent. The signaling backhaul has two major properties.

First, the backhaul mechanism multiplexes the signaling for all of the Q.931/H.245 sessions onto a single session between the backhaul proxy and the call agent. This reduces the need for thousands of TCP connections on a call agent down to merely needing a single session between the call agent and each backhaul proxy.

Second the backhaul protocol need not be TCP. Using a different type of transport, dropped TCP packets pertaining to any subset of the multiplexed connections need not block the transmission of PDUs for the rest of the multiplexed set of connections. Several transports can achieve this capability. (See Cisco Use section for how we do it.)

When the call agent receives the mutliplexed PDUs for Q.931/H.245, they can be demultiplexed, intepreted, and acted upon as if they were received directly over TCP. If other PDUs must be sent to a peer H.323 entity in response to the PDUs coming from the backhaul proxies, the call agent "front-hauls" them by sending them over a similar multiplexed session back to the backhaul proxies.

When the backhual proxy receives front-hauled traffic from the call agent, it demultiplexes it and forwards it to the peer H.323 endpoint over normal TCP connections. In this way, all of the behavior of H.323 can be reproduced without the scalability problems.

Advantages: 1) Scalability is improved. While it is certainly possible to distribute the call agent intelligence across multiple platforms, many carrier-class solutions require extreme fault tolerance with very expensive hardware. Backhauling the H.323 traffic to a single, highly fault tolerant node can have significant cost advantages.

2) If H.323 is running on embedded gateways and other terminals, the range of functionality may be quite limited. Backhauling the traffic to a central, highly flexible call agent allows features to be added easily and rapidly.

EXHIBIT A